Fletcher, Heald & Hildreth, P.L.C.
1300 North 17th Street 11th floor
Arlington VA 22209
703-812-0400 (voice)
703-812-0486 (fax)

MITCHELL LAZARUS
703-812-0440
LAZARUS@FHHLAW.COM

February 6, 2002

Mr. William F. Caton, Acting Secretary
Federal Communications Commission
445 12th Street SW
Washington DC 20554

Re: ET Docket No. 98-153 -- Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmission Systems
Ex Parte Communication

Dear Mr. Caton:

Pursuant to Section 1.1206(a)(1) of the Commission's Rules, on behalf of XtremeSpectrum, Inc., I am electronically filing this written ex parte communication in the above-referenced proceeding.[1]

XtremeSpectrum responds to the January 30, 2002, filing of Sprint PCS ("Sprint PCS Filing"). We also incorporate by reference our ex parte filing of January 28 responding to several wireless companies, including Sprint PCS.

As we stated on January 28, the respective positions of the wireless companies and XtremeSpectrum are clearly drawn. The wireless industry claims that its studies predict interference from ultra-wideband (UWB) into PCS. XtremeSpectrum, on the other hand, maintains the PCS industry studies relied on incorrect assumptions, and with those assumptions corrected, predict *no* interference. Much of the dispute continues to center on those assumptions.

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[1] XtremeSpectrum, with 67 employees, conducts research in ultra-wideband communications systems as its sole business. XtremeSpectrum intends to become a ultra-wideband communications manufacturer once the Commission authorizes certification of such systems. XtremeSpectrum takes no position on ultra-wideband radar applications.

We respond here only to new arguments, and will not burden the record by revisiting old ones. *Our disinclination to reply yet again to repetitive arguments is not an acquiescence to those arguments.* We use the attached table format for brevity.

If there are questions about this submission, please call me at the number above.

Respectfully submitted,

Mitchell Lazarus
Counsel for XtremeSpectrum, Inc.

cc: Chairman Michael Powell
Commissioner Kathleen Q. Abernathy
Commissioner Michael J. Copps
Commissioner Kevin J. Martin
Peter Tenhula, Chairman Powell's Office
Bryan Tramont, Commissioner Abernathy's Office
Paul Margie, Commissioner Copps's Office
Monica Desai, Commissioner Martin's Office
Edmund J. Thomas, Chief, OET
Bruce Franca, Deputy Chief, OET
Julius P. Knapp, Deputy Chief, OET
Michael Marcus, Associate Chief of Technology, OET
Lisa Gaisford, Chief of Staff, OET
Karen E. Rackley, Chief, Technical Rules Branch, OET
John A. Reed, Senior Engineer, Technical Rules Branch, OET

XtremeSpectrum Responses to the Sprint PCS Ex Parte Filing of January 30, 2002

Sprint PCS alleges: The impact of a UWB device cannot be evaluated on a narrowband basis, but must take into account the total power generated across several gigahertz of spectrum.[2]	***XtremeSpectrum responds***: A PCS handset is sensitive to interference only in the narrow frequency band it receives. It is unaffected by UWB emissions elsewhere in the spectrum. So far as a PCS handset is concerned, UWB power cannot exceed *6 billionths of a watt*.[3]
Sprint PCS alleges: XtremeSpectrum's comparisons between UWB and digital devices are proved to be invalid, because Sprint PCS tested a 2 GHz desktop computer (chosen for its proximity to the 1.9 GHz PCS band) and found low emissions levels in the PCS band.[4]	***XtremeSpectrum responds***: Sprint PCS hand-picked a computer *unlikely* to emit in the PCS band. A digital device radiates chiefly at frequencies that are multiples of its clock frequency, or that divide evenly into its clock frequency. PCS-band interference is far more probable from a device much slower (or faster) than 2 GHz.
Sprint PCS alleges: As computer speeds increase to 3 and 4 GHz, the potential for interference to PCS bands diminishes rapidly.[5]	***XtremeSpectrum responds***: Faster computers can still interfere in the PCS band. In particular, a computer whose clock speed is twice or three times PCS frequencies is likely to emit PCS-band interference.
Sprint PCS alleges: Current Part 15 devices do not impact the noise floor in the PCS spectrum.[6]	***XtremeSpectrum responds***: (1) Sprint PCS's few isolated measurements do not establish this claim.[7] (2) Sprint PCS cannot rationally assume both the highest allowable emissions from UWB, and also Part 15 emissions far below those allowed.

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[2] Sprint PCS Filing at 2-3.

[3] *Details*: The NPRM and XtremeSpectrum both propose maximum UWB emissions limits in the PCS band at 12 dB below Part 15 levels, equivalent to 4.7 nW/MHz. The maximum PCS bandwidth is 1.25 MHz. The total UWB output power available to the PCS handset is this 4.7 * 1.25 = 6 nanowatts maximum.

[4] Sprint PCS Filing at 3 & n.9; attachment at 9.

[5] Sprint PCS Filing at 3, n.9.

[6] Sprint PCS Filing at 5.

[7] Moreover, Sprint PCS's placing the antenna "less than six inches" from the computer under test put the antenna in the near field of the emissions, making extrapolation to longer ranges meaningless. *See* Sprint PCS Filing at Attachment, page 10. Sprint PCS additionally miscalculated the propagation loss from six inches to 3 meters. *Id*.

Sprint PCS alleges [by implication]: The only sources of interference in the PCS band are UWB and Part 15.	***XtremeSpectrum responds***: Sprint PCS continues to ignore the effect of PCS/PCS interference. Signals from a competing provider's handset, leaking from another frequency block, are permitted 10,000 times more power than UWB.[8] Additional noise comes from same-provider PCS base stations serving other cell sites nearby. The PCS industry's own filings show this noise is much higher than Part 15 noise.[9]
Sprint PCS alleges: The Sprint PCS studies used "appropriate" emissions limits, not levels higher than those proposed.[10]	***XtremeSpectrum responds***: Sprint PCS relies on a Qualcomm study that set UWB power 12 dB higher than the NPRM level.[11] Sprint PCS's own experimental study used power levels 4 dB higher than those in the NPRM.[12]
Sprint PCS alleges: The Sprint PCS studies used a conservative estimate of the number of UWB devices.[13]	***XtremeSpectrum responds***: A study filed by Sprint PCS included curves for "relatively high" UWB densities at $\rho = 0.1$, which corresponds to 1 UWB device per 10 square meters, or 100,000 per square km.[14] This is 10 times the population density of metropolitan New York City.[15] Sprint PCS's analytical model depends critically on the densities assumed.

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[8] For details, see our ex parte filing of January 3, 2002, at 6 & nn.17 & 18.

[9] *Details*: Sprint PCS presented an analysis showing that "outer cell" interference (OCI) is 5 dB above the noise floor at the edge of the cell. Jay Padgett, *A Model for Calculating the Effect of UWB Interference on a CDMA PCS System* at Attachment 1, page 24, Figure A-3, filed as an attachment to Letter from Charles W. McKee, Sprint PCS to Magalie Roman Salas, FCC (filed Sept. 12, 2000).

[10] Sprint PCS Filing at 5.

[11] *E.g.*, Sprint PCS Filing at 4, n.12.

[12] *Details*: Sprint PCS's UWB test device had an effective power of -49.1 dBm into the PCS band, which is 4 dB higher than the NPRM levels. *Summary of Testing Performed by Sprint PCS and Time Domain to Characterize the Effect of Ultra Wideband (UWB) Devices on an IS-95 PCS Syste*m at Attachment 2, page 9, filed as an attachment to Letter from Charles W. McKee, Sprint PCS to Magalie Roman Salas, FCC (filed Sept. 12, 2000).

[13] Sprint PCS Filing at 5.

[14] Jay Padgett, *A Model for Calculating the Effect of UWB Interference on a CDMA PCS System* at Attachment 1, page 10, filed as an attachment to Letter from Charles W. McKee, Sprint PCS to Magalie Roman Salas, FCC (filed Sept. 12, 2000).

[15] See our ex parte filing of January 3, 2002, at 5 & n.14.

Sprint PCS alleges: Microwave ovens and wireless operating at 400 to 2800 times more power than UWB devices are restricted to the 2.4 GHz ISM band.[16]	***XtremeSpectrum responds***: The numbers specified are the *out-of-band emissions limits* for these devices, and are permitted in the PCS band.[17]
Sprint PCS alleges: Propagation is not an issue at 4 meters.[18]	***XtremeSpectrum responds***: The statement in our filing disputed by Sprint PCS plainly refers to propagation over a 10 meter range.[19]
Sprint PCS alleges: XtremeSpectrum assumes all UWB devices are more than 100 meters from a PCS handset. [20]	***XtremeSpectrum responds***: Sprint PCS refers to our hypothetical demonstration on aggregation that involves 100,000 UWB emitters at 100 meters from a PCS handset. (All 100,000 emitters together generate less than 1% of the interference produced by one emitter at 3 meters). Both the 100,000 UWB units and the 100 meter distance are plainly hypothetical.[21] A more realistic hypothetical similarly shows that harmful aggregation does not occur: Ten UWB emitters at 10 meters from a PCS handset together generate less than 1% of the interference produced by one emitter at 3 meters.[22]

[16] Sprint PCS Filing at 6.

[17] See our ex parte filing of January 3, 2002, at 15 & n.42

[18] Sprint PCS Filing at 6.

[19] See our ex parte filing of January 3, 2002, at 7.

[20] Sprint PCS Filing at 7.

[21] See our ex parte filing of January 3, 2002, at 7-8.

[22] *Details*: This assumes same-room propagation losses at $1/R^2$ for the emitter 3 meters away, and $1/R^4$ for emitters 10 meters away.

Sprint PCS alleges: Authorizing UWB would make the Government liable for damages for breach of a contract that gave Sprint PCS exclusive rights to use its spectrum.[23]	***XtremeSpectrum responds***: This position remains unsupported. Sprint PCS offers no legal authority for its key assertion that its licenses "have effectively become a contract" with the Government.[24] And Sprint PCS ignores our observation that it bid on spectrum subject to pre-existing Commission rules that allow Part 15 operation in the PCS bands.
Sprint PCS alleges: UWB will negatively affect E911 operation.[25]	***XtremeSpectrum responds***: See our ex parte filing of January 23, 2002, in response the filing by Qualcomm Inc. of January 11, 2002.
Sprint PCS alleges: No UWB proponent (other than Time Domain in conjunction with Sprint PCS) has conducted UWB/PCS interference tests.[26]	***XtremeSpectrum responds***: We think the wireless companies' tests and analyses were well done, except for certain assumptions. We accept the wireless companies' methods with those assumptions corrected.

[23] Sprint PCS Filing at 7.

[24] Sprint PCS Filing at 8.

[25] Sprint PCS Filing at 8.

[26] Sprint PCS Filing at 2.